



Study on bacterial vaginosis among a group of Iraqi women

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Article History

Received: 18 June 2020

Reviewed: 19/June/2020 to 23/July/2020

Accepted: 24 July 2020

E-publication: 29 July 2020

P-Publication: September - October 2020

Citation

Kawakeb N Abdulla, Saba Reyadh Shaker, Hayder A Fawzi. Study on bacterial vaginosis among a group of Iraqi women. *Medical Science*, 2020, 24(105), 3012-3016

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General Note



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ABSTRACT

Objective: the isolation and identification of bacteria in women with clinical vaginosis. **Methods:** A cross sectional which included 176 women diagnosed with BV according to Amsel criteria. The study carried out in National Cancer Research Center – University of Baghdad, the participants were collected during the period from February 2019 to December 2019. The participants undergo vaginal swab and then it was subjected gram stain for bacterial identification. The swab was performed by trained clinicians, in which a sterile unlubricated speculum was inserted into the vagina then the specimens were collected from the lateral vaginal wall and posterior fornix using two sterile cotton tipped swabs, the swabs removed carefully to avoid contamination. **Results:** The study

included 176 women diagnosed with BV, mean age was 31.4 ± 8.9 years, the most common type *Staphylococcus aureus* with 19% prevalence, followed by *Escherichia coli* (16%), 12% *Enterobacter* spp, 11% *Klebsiella pneumonia*, 9% and lastly 1% *Neisseria* spp. **Conclusions:** Gram negative bacteria showed the highest rate for causing bacterial vaginosis, only one type of gram-positive bacteria was present (*Staphylococcus*) which showed the highest prevalence of all the bacteria.

Keywords: Bacterial vaginosis, microbiota, Gram negative bacteria, contamination

1. INTRODUCTION

Bacterial vaginosis (BV) is one of the most important causes of vaginal discharge with estimated prevalence of 40 – 50% (Morris *et al.*, 2001; Tolosa *et al.*, 2006), in a recent meta-analysis in 2019 that examined the global prevalence of BV but it in the range of 23 – 29% worldwide (Peebles *et al.*, 2019). An altered vaginal microbiota is the main cause of BV, in which the production of Hydrogen peroxide-producing lactobacilli is reduced which in term increase the pH of the vaginal media and consequently cause overgrowth of anaerobic bacteria (Swidsinski *et al.*, 2005; Jung *et al.*, 2017). In addition several other risk factors are associated with BV like; sexual activity (Fethers *et al.*, 2008), race and ethnicity (Beamer *et al.*, 2017; Allsworth and Peipert, 2007), douching (Ness *et al.*, 2002), and cigarette smoking (Bradshaw *et al.*, 2014).

BV can lead to several maternal adverse outcomes like endometrial bacterial colonization, postpartum fever, premature labor (Leitich and Kiss, 2007) and other complications (Andrews *et al.*, 2006; Oleen-Burkey and Hillier, 1995; MacDermott, 1995), hence screening for the infection is highly important during pregnancy. Severity of the infection of bacterial vaginitis may increase the chance of infection with sexually transmitted diseases which in turn increase risk of cancer. The current work objection is the isolation and identification of bacteria in women with clinical vaginitis.

2. PATIENTS AND METHODS

Study design

A cross sectional which included 176 women diagnosed with BV according to Amsel criteria. The participants undergo vaginal swab and then it was subjected gram stain for bacterial identification. The swab was performed by trained clinicians, in which a sterile unlubricated speculum was inserted into the vagina then the specimens were collected from the lateral vaginal wall and posterior fornix using two sterile cotton tipped swabs, the swabs removed carefully to avoid contamination. The first swab was used for the preparation of a smear for Gram staining, and the 2nd swab was placed into Amies transport media for culture.

Study setting

The study carried out in National Cancer Research Center – University of Baghdad, the participants were collected during the period from February 2019 to December 2019.

Diagnostic criteria

The diagnosis of BV is based on the presence of 3 more of Amsel criteria, which included: 1) elevated pH (>4.5), 2) Clue cells ($\geq 20\%$ on saline microscopy), 3) vaginal discharge, and 4) Fishy odor (after applying a solution with 10% potassium) (Amsel *et al.*, 1983, Mohammadzadeh *et al.*, 2014).

Inclusion criteria

Women age between 15 – 49 years,

Exclusion criteria

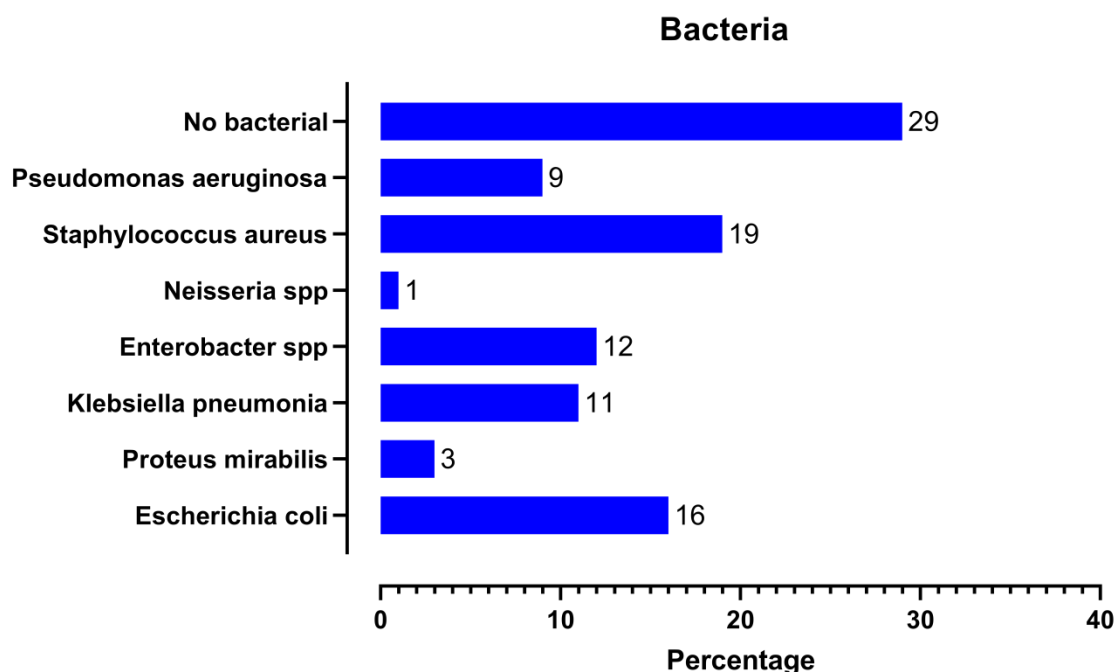
Women using intrauterine contraceptive devices, those on active antibacterial drugs (oral or vaginal) during the last two weeks

3. RESULTS

The study included 176 women diagnosed with BV, mean age was 31.4 ± 8.9 years, the most common type *Staphylococcus aureus* with 19% prevalence, followed by *Escherichia coli* (16%), 12% *Enterobacter* spp, 11% *Klebsiella pneumonia*, 9% and lastly 1% *Neisseria* spp, as illustrated in table 1 & figure 1.

Table 1 pathological bacterial that presented in vagina of female participants

Bacterial	Number (%)
<i>Escherichia coli</i>	28 (16%)
<i>Proteus mirabilis</i>	5 (3%)
<i>Klebsiella pneumonia</i>	19 (11%)
<i>Enterobacter spp</i>	21 (12%)
<i>Neisseria spp</i>	2 (1%)
<i>Staphylococcus aureus</i>	33 (19%)
<i>Pseudomonas aeruginosa</i>	16 (9%)
No bacterial	51 (29%)

**Figure 1** assessment of the prevalence of bacterial vaginosis

4. DISCUSSION

The alteration of normal bacterial flora is associated with the development of BV, which is one of the most important causes of pathological vaginal discharge (Coleman and Gaydos, 2018). In the present study the rate of negative bacterial swab was present in 52% of the swabs, while gram-positive was present in 19% of the cases. Despite the high prevalence of gram-negative bacteria, individually *Staphylococcus* bacteria (19%) were higher than each of gram-negative bacteria. *E. coli* showed the highest rate (16%) among the gram-negative bacteria.

This finding was in agreement with another study, in which *E coli* showed the highest prevalence (13.8%), followed by *Klebsiella spp* (13.4%), *Enterobacter spp* (11.7%), and *Pseudomonas aeruginosa* (9.47%) with 59.2% gram negative in the sample (Khamees, 2012), while 24.1% had gram-positive bacterial mostly *Staphylococcus* bacteria (Khamees, 2012). This finding also reported by several Iraqi studies (Al-Jobori, 2008; Al-Jammaly and Abdulla, 2008; Al-Taweel *et al.*, 2015; Abdulameer and Kandala, 2016; Ibrahim *et al.*, 2019).

BV is distinct disease that is associated with reduction in the population of the natural gram-negative normal flora (*Lactobacilli spp*) which is associated with overgrowth of pathological bacteria especially gram-negative anaerobic (Yeoman *et al.*, 2010). Cultivation studies give an insight about the phenotypic characteristics of microbes which will allow for the experimental manipulation of these organisms and testing theoretical hypothesis about their pathogenesis and their virulence (Srinivasan and Fredricks, 2008).

5. CONCLUSION

Gram negative bacteria showed the highest rate for causing bacterial vaginosis, only one type of gram-positive bacteria was present (*Staphylococcus*) which showed the highest prevalence of all the bacteria.

Author contribution

Kawakeb N Abdulla: Conception and design of the work, the acquisition, analysis, and interpretation of data for the work, and Drafting the work.

Saba Reyadh Shaker: Conception and design of the work, interpretation of data for the work, and revising it critically for important intellectual content

Hayder A Fawzi: Conception and design of the work, and Drafting the work and finally revising it critically for important intellectual content

Funding

This study was funded by authors only

Conflict of Interest

The authors declare that they have no conflict of interest.

Informed consent

Written informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval for human

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards (Code: 2019/D015).

Data and materials availability

All data associated with this study are present in the paper.

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